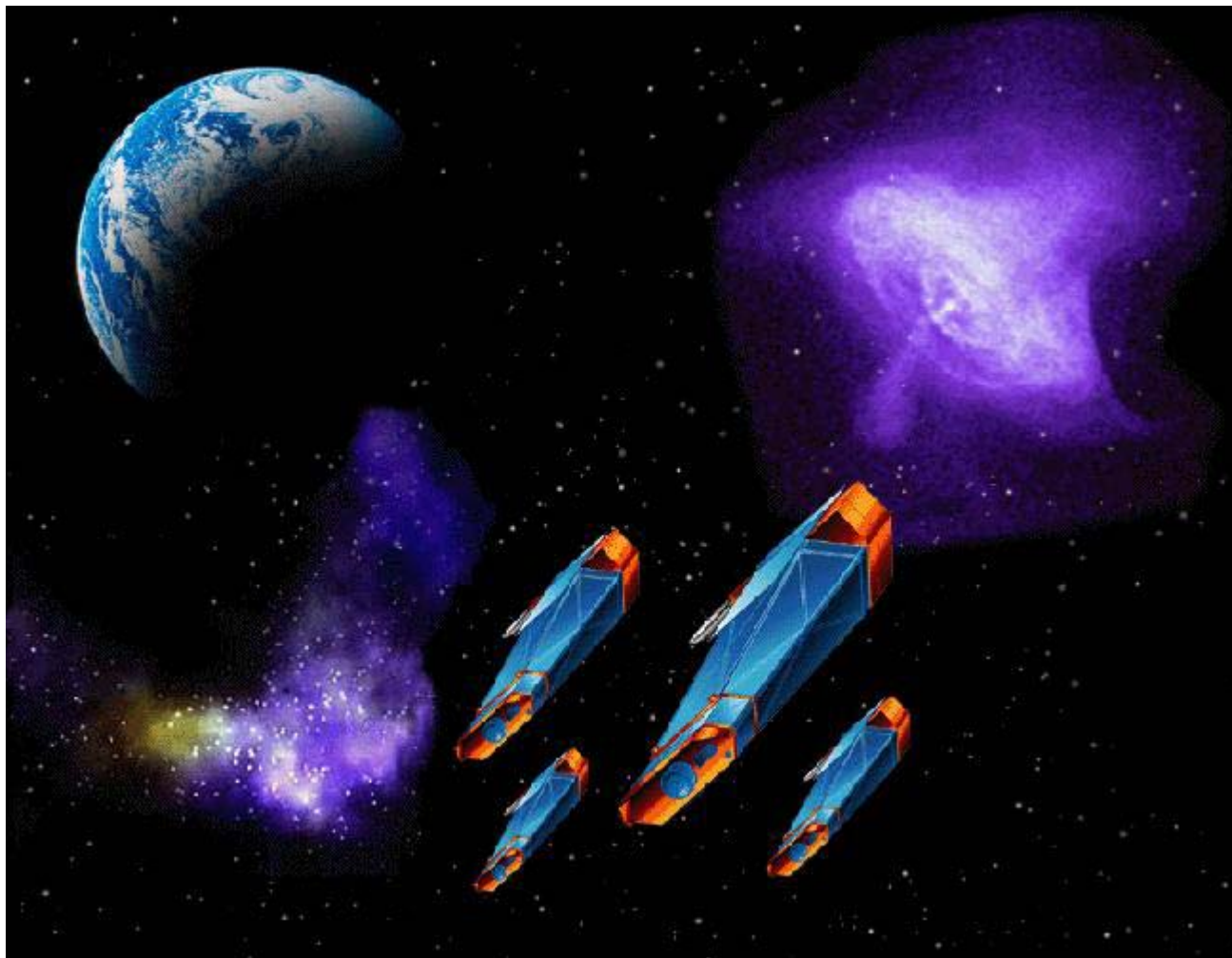




Constellation-X SXT optics tasks at MSFC



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MSFC FY2002 SXT optics tasks

☐ **Support segmented-mirror development.**

- Deposit glass (SiO_2) onto 0.5-m-diameter cylindrical metal mandrels.
 - Enhance durability of and reduce gold adherence to mandrel's surface.
- Process 0.5-m cylindrical mandrels for GSFC epoxy-replication experiments.
 - Chemically strip epoxy, clean, and gold coat mandrels.
- Perform metrology on mandrels and mirrors, as needed.

☐ **Procure meter-class segment precision mandrels.**

- Purchase Zerodur™ segment mandrels for segmented optics development.
 - Ordered one mandrel from Zeiss; plan to exercise option for two more.
 - Will receive first mandrel (30° segment, 1.6-m diameter) in 2002 August.
- Conduct acceptance inspection and metrology on delivered mandrels.

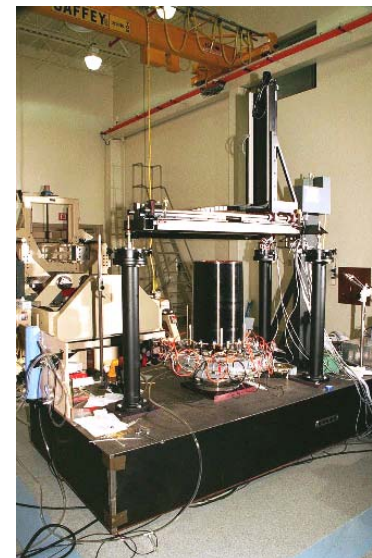
☐ **X-ray test optics.**

- Perform x-ray testing in 100-m facility, where possible (mirror pairs & EU).
 - Are designing and will fabricate 6-DOF optics mount.
- Perform x-ray testing in (530-m) XRCF, where needed (flight-type modules).



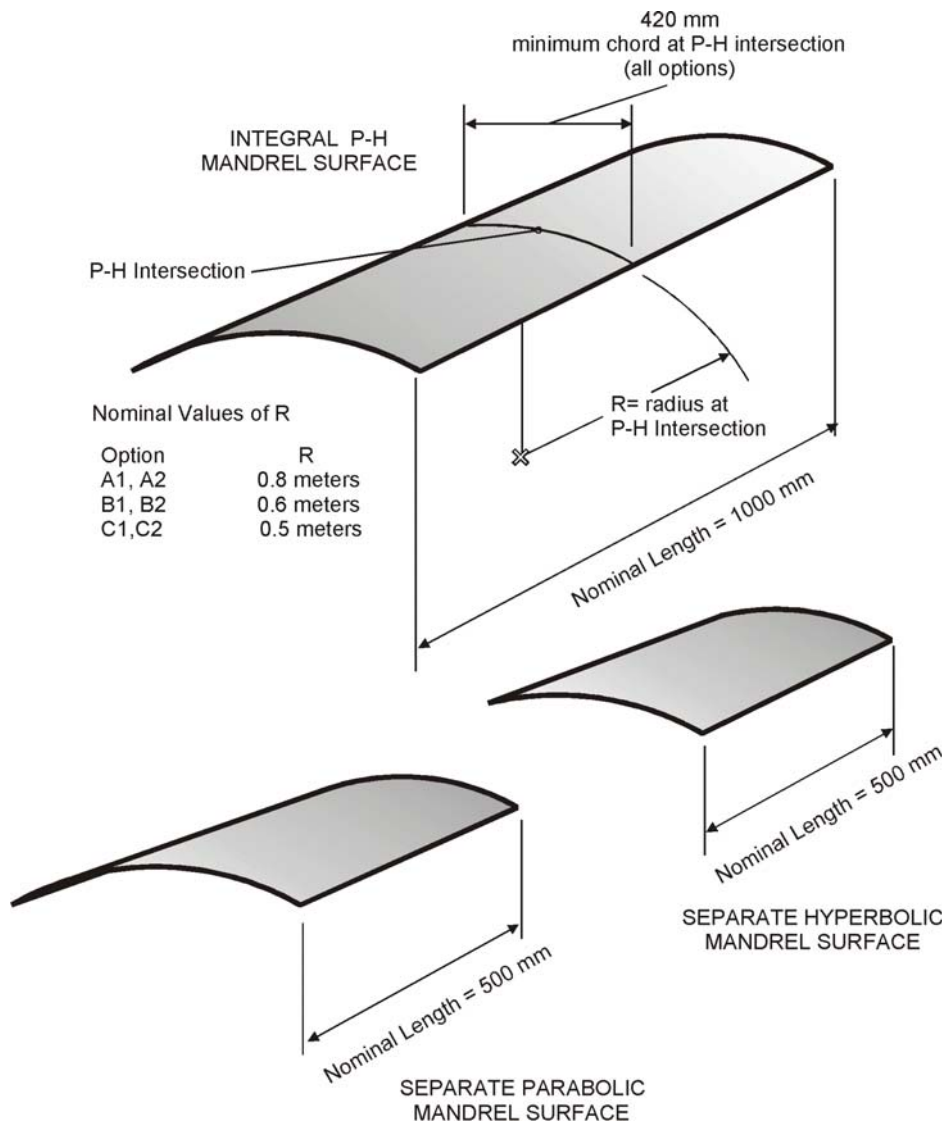
Support for GSFC epoxy replication

- ❑ **Support replication from 0.5-m mandrels.**
 - Process full-cylinder mandrels.
 - Strip epoxy from metal mandrels.
 - Precision clean mandrels.
 - Deposit gold prior to replication.
 - Assist GSFC with replication, as requested.
 - Conduct metrology of large mandrels & mirrors, as requested.
- ❑ **GSFC will process segment mandrels.**





Precision mandrels for segmented optics



□ Full-cylinder metal mandrels

- $HPD_{geom} < 5''$, $\sigma < 0.4 \text{ nm}$ ($f > 1 \text{ mm}^{-1}$)
- $D = 0.50 \text{ m}$, $L = 0.60 \text{ m}$, $F = 8.4 \text{ m}$
 - 1999-Aug delivery from Zeiss (2)
- Segmented mirrors for engineering unit
- Potential use for smaller flight segments
 - Glass-coated for epoxy replication
 - Possible cost and time savings

□ Segment glassy-ceramic mandrels

- $HPD_{geom} < 4''$, $\sigma < 0.4 \text{ nm}$ ($f > 1 \text{ mm}^{-1}$)
- $D = 1.6 \text{ m}$ (30°), $L = 1.0 \text{ m}$, $F = 10.0 \text{ m}$
 - 2001-Jul contract signing with Zeiss
 - 2002-Aug scheduled delivery
- $D = 1.2 \text{ m}$ (30°), $L = 1.0 \text{ m}$, $F = 10.0 \text{ m}$
 - 2002-Feb option to be exercised
 - 2003-Mar projected delivery
- $D = 1.0 \text{ m}$ (30°), $L = 1.0 \text{ m}$, $F = 10.0 \text{ m}$
 - 2002-Feb option to be exercised
 - 2003-Nov projected delivery
- Segmented mirrors for flight prototype



Characterization of x-ray performance

❑ Facilities for testing 10-m focal-length optics

- 100-m “Stray-Light Facility”
 - Design and fabricate 6-DOF optics mount.
 - Test SXT and HXT development optics and modules.
- 530-m X-ray Calibration Facility (XRCF)

